

Title: GROUP A STREPTOCOCCAL VACCINES

Express Mail No. EV170136572US

Inventor(s): James B. Dale Serial No. 09/151,409

Docket No. 481112.410

APPROVED BY	O.G. FIG. CLASS	SUBCLASS
DRAFTSMAN		

SphI	BamHI	Sall	Ncol	PstI	KpnI	ClaI	HindIII
5'	M24	M5	M6	M19	M1.0	M3	3'

60 Codons 58 Codons 35 Codons eq.

Fig. 1

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10/17/02
JC853 U.S. PTO
Barcode

APPROVED	O.G. FIG.	SUBCLASS
BY		
DRAFTSMAN		

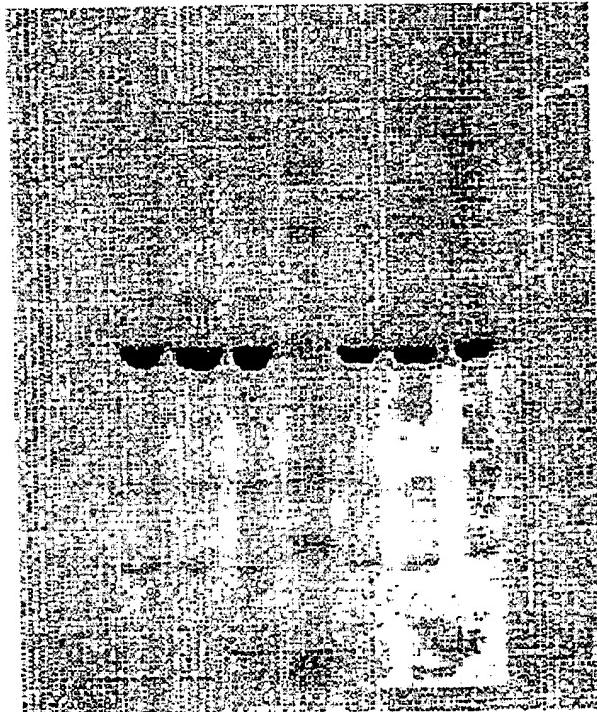
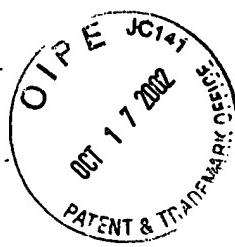


Fig. 2



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APPROVED	O.G. FIG.
BY	CLASS
DRAFTSMAN	SUBCLASS

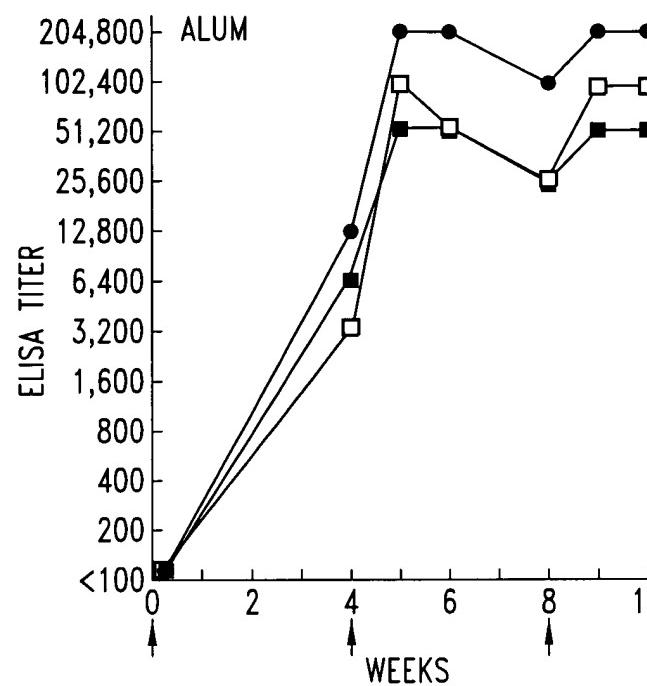


Fig. 3A

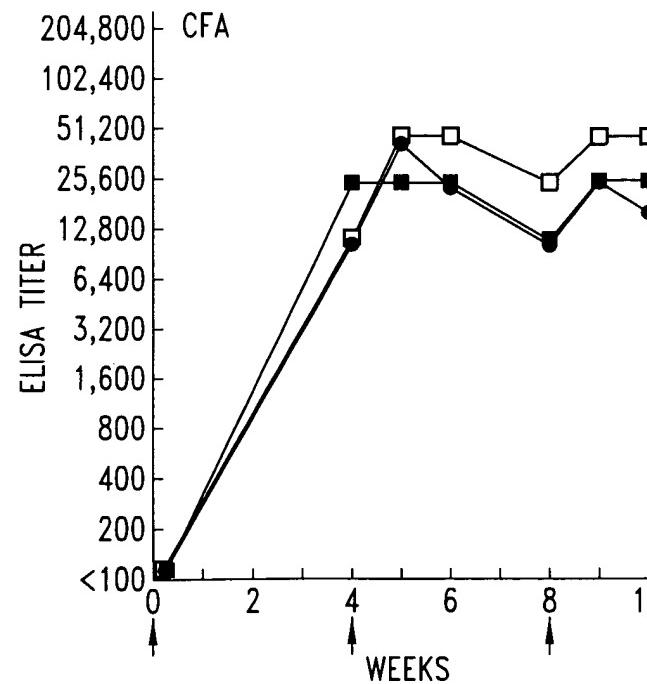
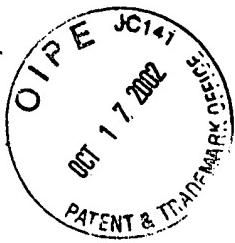


Fig. 3B



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APPROVED	O.G. FIG.
BY	CLASS
DRAFTSMAN	SUBCLASS

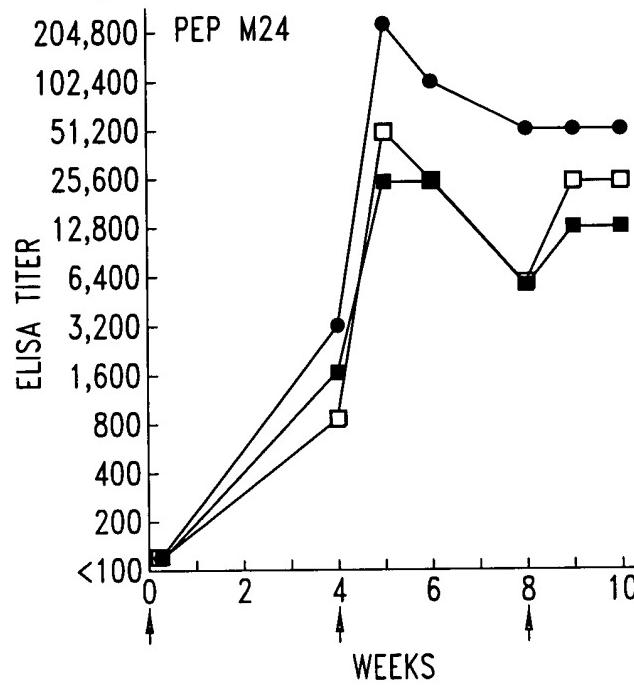


Fig. 4A

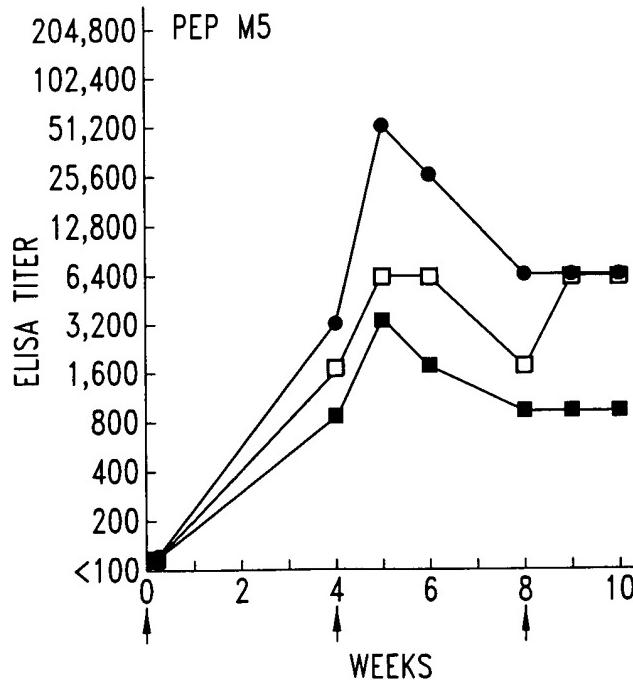
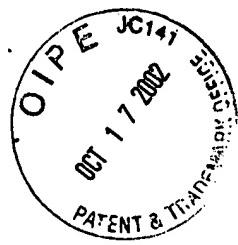


Fig. 4B



Title: GROUP A STREPTOCOCCAL VACCINES
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APPROVED BY	Q.G. FIG.	CLASS	SUBCLASS
DRAFTSMAN			

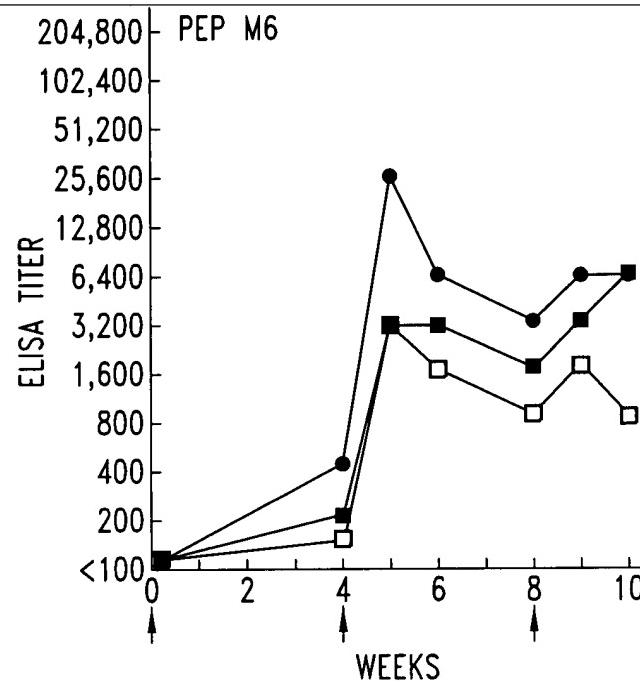


Fig. 4C

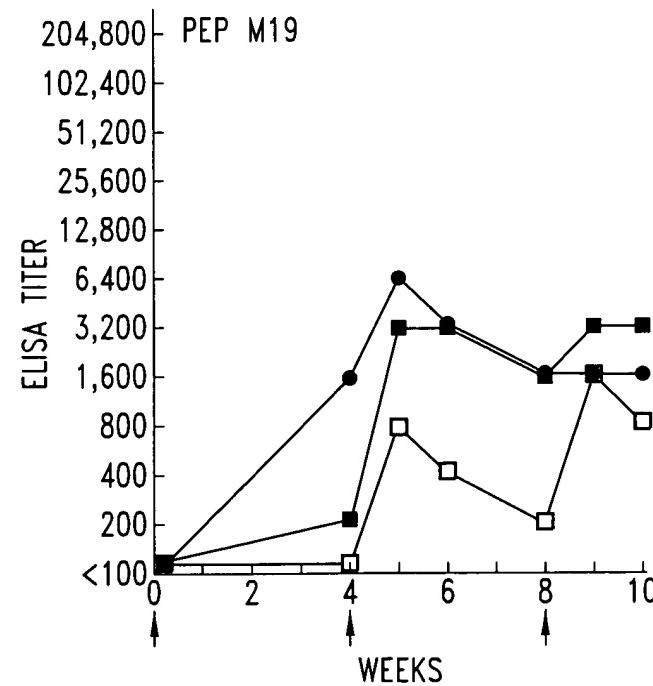


Fig. 4D



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APPROVED BY	O.G. FIG.	CLASS	SUBCLASS
DRAFTSMAN			

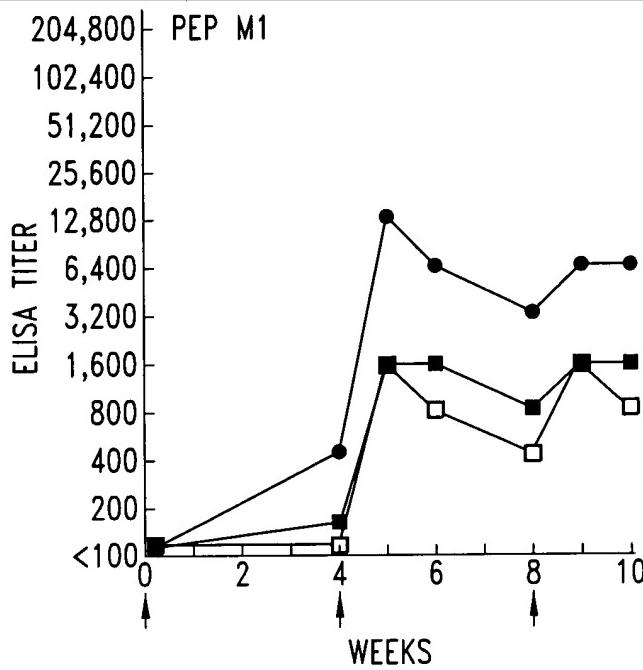


Fig. 4E

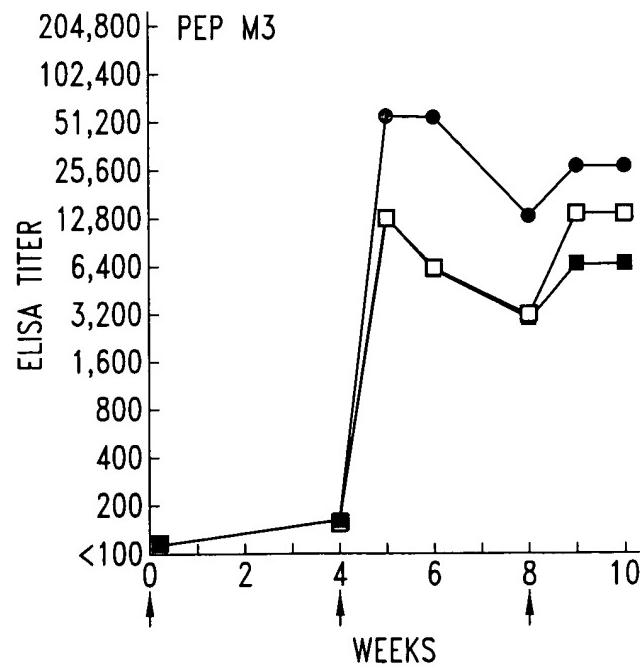
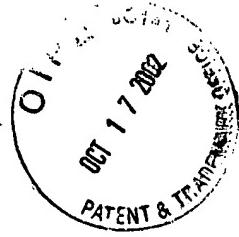


Fig. 4F



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APPROVED	O.G. FIG.	SUBCLASS
BY	CLASS	
DRAFTSMAN		

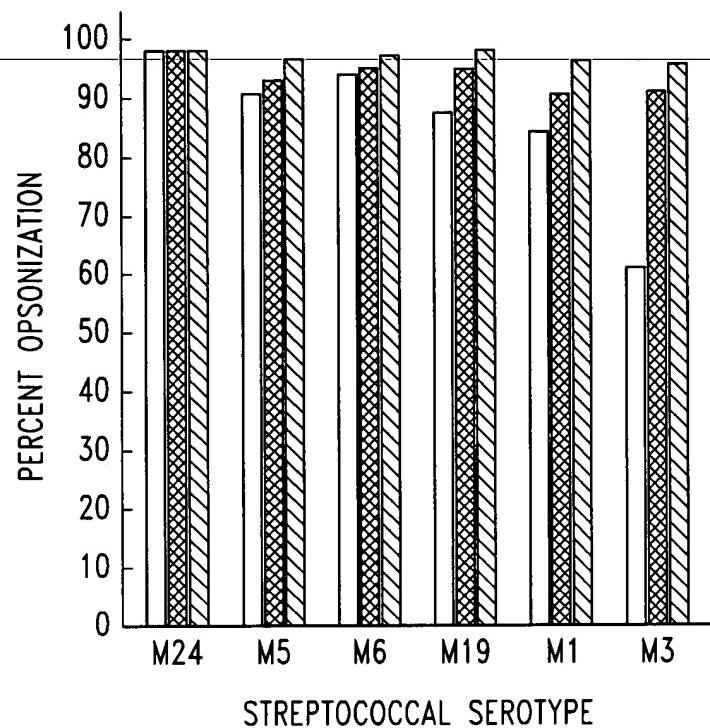


Fig. 5

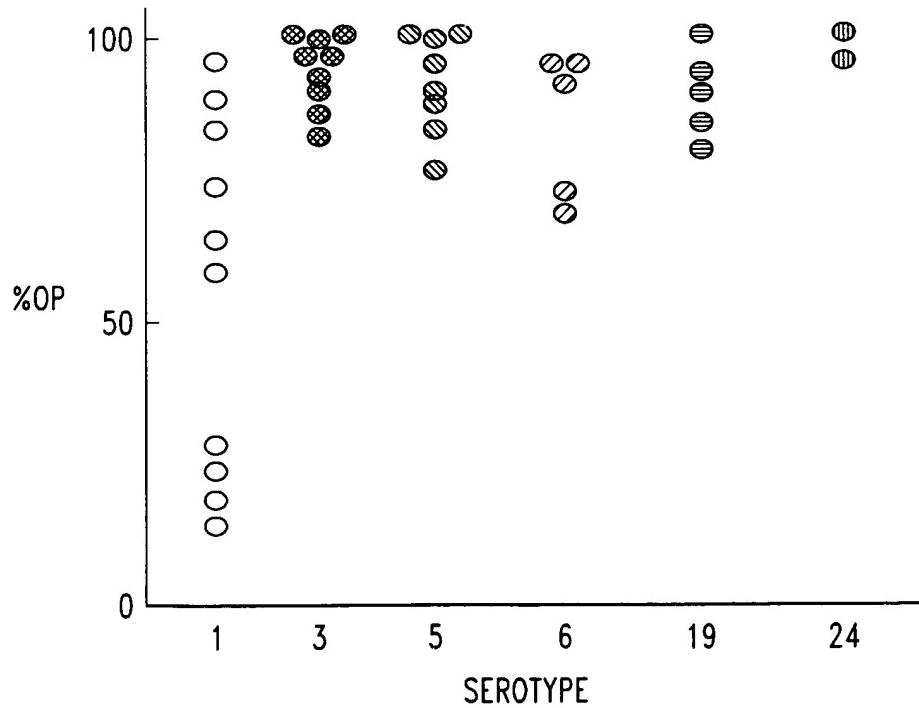
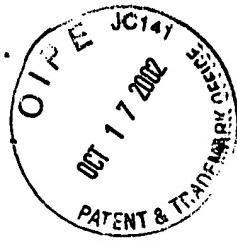


Fig. 6



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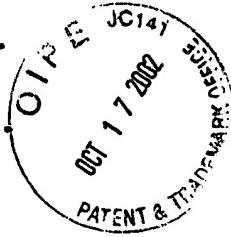
Docket No. 481112.410

HEXAVALENT M.PROTEIN VACCINE SEQUENCE

O.G. FIG.	SUBCLASS
CLASS	
APPROVED BY DRAFTSMAN	

*	10	*	20	*	30	*	40	*	50	*	60	*	70	*	
GCA TGC ATG GTC GCG ACT AGG TCT CAG ACA GAT ACT CTG GAA AAA GTA CAA GAA CGT CCT GAC AAG TTT GAG ATA Ala Cys Met Val Ala Thr Arg Ser Gln Thr Asp Thr Leu Glu Lys Val Gln Glu Arg Ala Asp Lys Phe Glu Ile -SphI- M24----->															
*	80	*	90	*	100	*	110	*	120	*	130	*	140	*	150
GAA AAC AAT ACG TTA AAA CTT AAG AAT AGT GAC TTA AGT TTT AAT AAT AAA GCG TTA AAA GAT CAT AAT GAT GAG Glu Asn Asn Thr Leu Lys Leu Lys Asn Ser Asp Leu Ser Phe Asn Asn Lys Ala Leu Lys Asp His Asn Asp Glu															
*	160	*	170	*	180	*	190	*	200	*	210	*	220	*	*
TTA ACT GAA GAG TTG AGT AAT GCT AAA GAG AAA CTA CGT GGA TCC GCC GTG ACT AGG CGT ACA ATA AAT GAC CCG Leu Thr Glu Glu Leu Ser Asn Ala Lys Glu Leu Arg Gly Ser Ala Val Thr Arg Gly Thr Ile Asn Asp Pro -BamHI- M5----->															
*	230	*	240	*	250	*	260	*	270	*	280	*	290	*	300
CAA AGA GCA AAA GAA GCT CTT GAC AAG TAT GAG CTA GAA AAC CAT GAC TTA AAA ACT AAG AAT GAA GGG TTA AAA Gln Arg Ala Lys Glu Ala Leu Asp Lys Tyr Glu Leu Glu Asn His Asp Leu Lys Thr Lys Asn Glu Gly Leu Lys															
*	310	*	320	*	330	*	340	*	350	*	360	*	370	*	*
ACT GAG AAT GAA GGG TTA AAA ACT GAG AAT GAA GGG TTA AAA ACT GAG AAT GAA GGG TTA AAA ACT GAG GTC GAC Thr Glu Asn Glu Gly Leu Lys Thr Glu Asn Glu Gly Leu Lys Thr Glu Asn Glu Gly Leu Lys Thr Glu Val Asp -SalI-															
*	380	*	390	*	400	*	410	*	420	*	430	*	440	*	450
AGA GTG TTT CCT AGG GGG ACG GTA GAA AAC CCG GAC AAA GCA CGA GAA CTT CTT AAC AAG TAT GAC GTA GAG AAC Arg Val Phe Pro Arg Gly Thr Val Glu Asn Pro Asp Lys Ala Arg Glu Leu Leu Asn Lys Tyr Asp Val Glu Asn M6----->															
*	460	*	470	*	480	*	490	*	500	*	510	*	520	*	*
TCT ATG TTA CAA GCT AAT AAT GAC AAG TTA CCA TGG AGA GTG CGT TAT ACT AGG CAT ACG CCA GAA GAT AAG CTA Ser Met Leu Gln Ala Asn Asp Lys Leu Pro Trp Arg Val Arg Tyr Thr Arg His Thr Pro Glu Asp Lys Leu -NcoI- M19----->															
*	530	*	540	*	550	*	560	*	570	*	580	*	590	*	600
AAA AAA ATT ATT GAC GAT CTT GAC GCA AAA GAA CAT GAA TTA CAA CAA CAG AAT GAG AAG TTA TCT CTG CAG AAC Lys Lys Ile Ile Asp Asp Leu Asp Ala Lys Glu His Glu Leu Gln Gln Asn Glu Lys Leu Ser Leu Gln Asn -PstI- M1.0															
*	610	*	620	*	630	*	640	*	650	*	660	*	670	*	*
GGT GAT GGT AAT CCT AGG GAA GTT ATA GAA GAT CTT GCA GCA AAC AAT CCC GCA ATA CAA AAT ATA CGT TTA CGT Gly Asp Gly Asn Pro Arg Glu Val Ile Glu Asp Leu Ala Ala Asn Asn Pro Ala Ile Gln Asn Ile Arg Leu Arg ----->															

Fig. 7A



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O.G. FIG.	SURCLASS
CLASS	
APPROVED BY DRAFTSMAN	

680 690 700 710 720 730 740 750

CAC GAA AAC AAG GAC TTA AAA GCG AGA TTA GAG AAT GCA ATG GAA GTT GCA GGA AGA GAT TTT AAG AGA GCT GGT
His Glu Asn Lys Asp Leu Lys Ala Arg Leu Glu Asn Ala Met Glu Val Ala Gly Arg Asp Phe Lys Arg Ala Gly
KpnI

760 770 780 790 800 810 820

* * * * * * *

ACC TTG TTA GAT CAG GTT ACA CAA TTA TAT ACT AAA CAT AAT AGT AAT TAC CAA CAA TAT AAT GCA CAA GCT GGC
Thr Leu Leu Asp Gln Val Thr Gln Leu Tyr Thr Lys His Asn Ser Asn Tyr Gln Gln Tyr Asn Ala Gln Ala Gly

--- M3 ----->

830 840 850 860 870 880 890 900

* * * * * * * *

AGA CTT GAC CTG AGA CAA AAG GCT GAA TAT CTA AAA GGC CTT AAT GAT TGG GCT GAG AGG CTG TTA CAA GAG TTA
Arg Leu Asp Leu Arg Gln Lys Ala Glu Tyr Leu Lys Gly Leu Asn Asp Trp Ala Glu Arg Leu Leu Gln Glu Leu

910 920 930 940 950 960 970

* * * * * * *

AAT ATC GAT GTC GCG ACT AGG TCT CAG ACA GAT ACT CTG GAA AAA GTA CAA GAA CGT GCT GAC AAG TTT GAG ATA
Asn Ile Asp Val Ala Thr Arg Ser Gln Thr Asp Thr Leu Glu Lys Val Gln Glu Arg Ala Asp Lys Phe Glu Ile

-Clal- M24 ----->

980 990 1000 1010 1020 1030 1040 1050

* * * * * * * *

GAA AAC AAT ACG TTA AAA CTT AAG AAT AGT GAC TTA AGT TTT AAT AAT AAA GCG TTA AAA GAT CAT AAT GAT GAG
Glu Asn Asn Thr Leu Lys Leu Asn Ser Asp Leu Ser Phe Asn Asn Lys Ala Leu Lys Asp His Asn Asp Glu

1060 1070 1080 1090 1100 1110 1120

* * * * * * *

TTA ACT GAA GAG TTG AGT AAT GCT AAA GAG AAA CTA CGT AAA AAT GAT AAA TCA CTA TCT GAA AAA GCT AGT AAA
Leu Thr Glu Glu Leu Ser Asn Ala Lys Glu Lys Leu Arg Lys Asn Asp Lys Ser Leu Ser Glu Lys Ala Ser Lys

1130 1140 1150

* * * * *

ATT CAA GAA TTA GAG GCA CGT AAG TAA AAG CTT
Ile Gln Glu Leu Glu Ala Arg Lys *** Lys Leu
Stop HindIII

Fig. 7B